PINEY MOUNTAIN AIR FORCE

Box 7304 * Charlottesville * Virginia * 22906 7304

DATA☆LETTER

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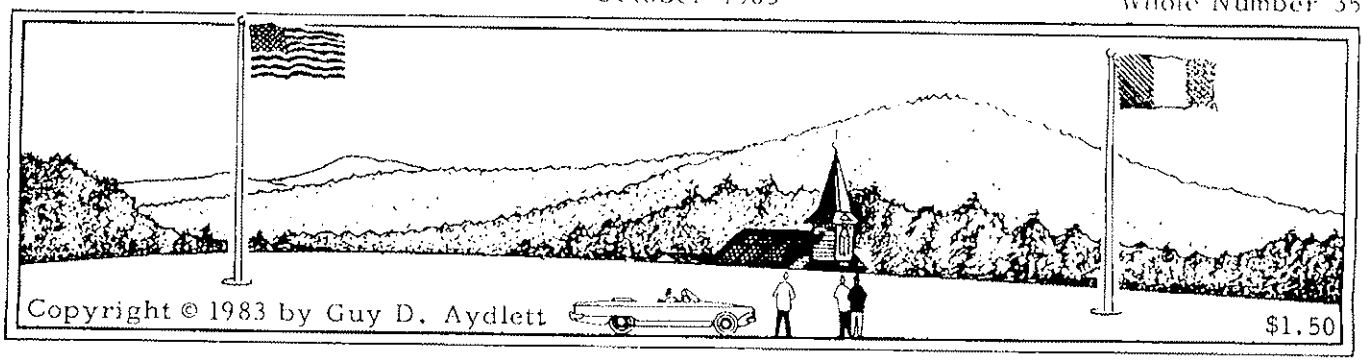

LITHO IN U.S.A.

OCTOBER, The Tenth Month, is famous for being the in-gathering month for AKA pilgrims. This year, fliers of all ages, sizes, and dispositions will assemble in Columbus, Ohio on the 6th through the 9th for the 6th Annual AKA Convention. Kites will be seen.

Piney Mountain Trolls are burning feathers and working up fine weather for the festival.

Although our nation celebrates Columbus Day on the 10th, the intrepid admiral landed at the Bahamas on 12 October in 1492.

BEAR DAY and Full Hunter's Moon—the 21st.

OCTOBER blesses pilots with 31 flying days.

*

JANET and CLARK NEWELL, Highland Beach, Florida, generously bestowed the fine nylon 5' x 8' Flag of Ireland to Piney Mountain Air Force. We joyfully display it on The Visitor's Mast in this month's masthead picture.

*

ALEASE HUBB'S name was misspelled in the caption on page 2 of *DATA LETTER No. 34*. The Non-editor lives up to his name, but air pilots Al and Alease Hubb have forgiven us.

*

MISTAH BLUCE of Goa, India deferred his tour of America's Wild West to help The Oldest Troll assemble PMAF's brand new, bright and colorful *Quicksilver MX* ultralight craft.

Although the manufacturer estimated the assembly time at 40 hours, the two assemblers proceeded with cautious restraint and squandered close to 80 hours on the project. The *MX* was completely assembled on Labor Day, fuel was tanked, and the engine was started for the first time at Hornbeam Hall. The following day, the engine was subjected to 1½ hours of on-ground break-in before we made short, low altitude test hops.

BILL ROBIE, Chief Test Pilot, put the fine little machine through exhaustive maneuvers in windy, turbulent air on the 8th. He didn't have to use his parachute, either. Bill kindly credited the loving ministrations of the two assemblers for producing a very stable aircraft. Anyway, it flies as well as a carefully crafted *Hornbeam Mark I* Alliflex Kite. . . .

Some of the Operations/Equipment specifications for the new *MX* are these:

Empty weight, 235 pounds; pilot weight, 120 to 240 pounds; maximum takeoff weight, 525 pounds. Stall speed—power off—is 24 mph; best angle of climb speed, 35 mph; best rate of climb speed, 37 mph; maximum structural cruise speed, 45 mph; maximum level flight speed, 52 mph; never exceed speed, 61 mph. Takeoff ground run—wind calm—69 ft.; total distance over 50 ft. obstacle, 150 ft. Landing ground roll—wind calm—60 ft.; total distance over 50 ft. obstacle, 150 ft. Rate of climb, 800 ft. per minute; service ceiling, 12,000 ft. —Low speeds, but *high* performance on 34 hp.

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Fascinated by these brief words about ultralights? If so, be sure to see the excellent story, "The Bird Men," by Luis Marden and Charles O'Rear in *National Geographic*, August 1983, pp. 198-217: splendid color photos.

KNOTTY KITELINE PHILOSOPHY

by Marty Shigeo Sasaki*

I've been doing a lot of testing of lines and their knots and thought that what I've learned so far might make an interesting small contribution to *PMAF Data Letter*. All of the testing was prompted by measuring the actual pull of several kites. An 80 inch high Sanjo Rokkaku (from your plans, *DL No. 4*) pulled roughly 15 pounds as measured by a fishing scale in 10 knot winds (measured at ground level). I suspect that taking into account the inaccuracy of the scale, and allowing for unexpected gusts, that the kite would not pull more than 50 pounds—even in strong winds.

Experience tells me, and several others on the flying field agree, that I should use my 130 pound test line. Anything less risks a break-away.

The culprit is the knot.

Clearly there is something wrong when an experienced crew of kite flyers will not trust their knots for anything more than about 50% of the line strength.

I couldn't find anything in the kite literature that dealt more than superficially with any knots and, more importantly, the knot strengths. Fortunately there is much interest in fishing knots, and most kite flyers use fishing line, anyway. The "bible" of fishing knots is *Practical Fishing Knots* by Lefty Kreh and Mark Sosin. I recommend the book to all kite flyers who are interested in maximum performance.

Here is a summary of what I have learned through reading and testing; but please note that the testing involved braided nylon and dacron fishing line, nylon monofilament, and some limited experience with Kevlar®:

§ Most of the knots that kite flyers use are suspect. Many of them significantly reduce knot strength. The lark's head with a simple loop is especially bad.

§ Knots should be tied carefully and pulled up tight with an even and steady pressure. Most knots slip before breaking: a carefully tightened knot will not slip and is less likely to break.

§ Different knots are effective with different line materials. Sometimes different brands of the same kind of material will have different knotting characteristics.

§ When tying braided nylon or dacron, the Bimini twist combined with the offshore swivel knot provide *[nearly?]* 100% of line strength. When both knots are tied carefully, the line is just as likely to break away from the knot as on the knot.

§ Splicing braided line together results in the strongest connection of two lines—almost 100%. If you must tie a knot, use the blood knot; but remember that the most you can probably expect from the blood knot is about 80% of the line strength.

§ Nylon monofilament can be tied successfully with a variety of knots, but I have found that with certain brands, the Bimini twist/offshore swivel knot combination is superior to all others. With one brand of line, I found that the improved clinch knot was superior. In all cases, the knots failed at 90%, or more, than the line strength.

§ Connecting monofilament together is best done with a surgeon's knot or a blood knot. Usually, the surgeon's knot works best with lower strengths of line up to 20 pound test. Heavier line is easier to connect with a blood knot. A recent article in *Saltwater Sportsman* recommended tying two pieces of monofilament together by tying each to the ends of a short length of dacron and using albright knots. The chosen piece of dacron should have a breaking strength well above that of the two pieces of monofilament.

§ Under tension, nylon stretches up to 35%. It doesn't matter whether it is braided, twisted, or monofilament. Winding tensioned and stretchy line onto a reel is just asking for a mess of trouble, because each turn contributes its stored energy as a crushing force on the core of the reel. The reel must be constructed to withstand enormous crush-loads.

§ It is important to tie knots carefully and to experiment a little. Each person ties knots a little differently, and what works best for

(see "Knots" on page 4)

* Marty Sasaki is an avid kiteflier, kitemaker, and experimenter. He is a vital spirit of Kites Over New England (K.O.N.E.). Marty sets type and lays out *Flypaper*, the club's newsletter.

A RECAP OF THE HORNBEAM MARK I ALLIFLEX KITE

by Beauforce Stringfellow and Fline Kermud-Jinn

HORNBEAM MARK I continues to enjoy worldwide popularity because of its excellent flying characteristics and the ease with which it can be laid out, made, and flown by children or adults who have had little experience with the kiteflying sport or hobby. A noteworthy part of the charm of "THE HORNBEAM," as its host of friends like to call it, is its adaptability to being fabricated in a large range of sizes from readily found materials in the home, at school, at kite club seminars, and in the science museums of the world.

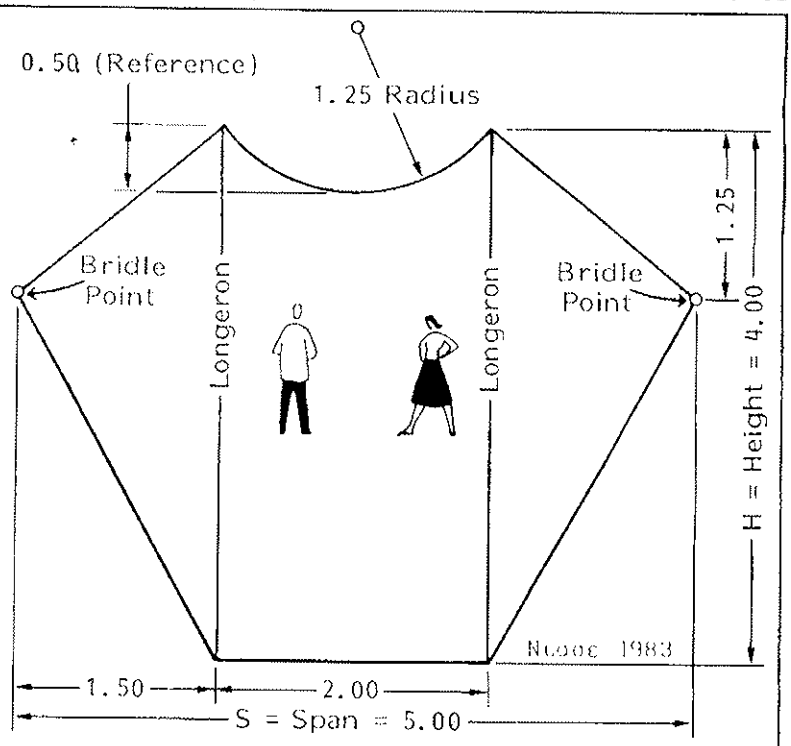
NOTES:

The drawing is dimensioned in arbitrary modules. Choose your own value for a module and multiply it by the numbers shown. Example: If you chose 10" for your module, the kite would be 40" high and 50" wide.

Make your longerons of any light weight, moderately flexible material. Small kites will fly well if a stapled or taped crease is made in the covering material at each longeron location. Allow extra material for the self-creases or pleats.

Make a two-branched V-bridle of stretch resistant braided line. Each branch should be about three modules in length. If your kite leans in flight, shorten the low-side branch.

Bridle points can be loops of line --or grommets--fixed to reinforced or hemmed covering at the corners.



HORNBEAM MARK I

As flown by Piney Mountain Air Force

Area = $A = 0.83 \times H^2$

Aspect ratio = $\frac{S^2}{A} = 1.88$

It is estimated that one-half million Hornbeams have been enjoyed by kitefliers since it was designed in the spring of 1976 (see *DL No. 2*).

For whatever reason, the occasional ersatz "Hornbeam" may be seen flying (often not too well) at a kite festival; and its maker often appears to believe he has the genuine article.

Therefore, we believe it is time to recap; time to encourage maintaining the purity of the Hornbeam planform.

Recapitulation bears with it the temptation to expand on the design theme, but it may be appropriate here to mention briefly a few items of interest that have emerged during the course of seven years of flying Hornbeam:

The planform should not be altered.

Any flexible, lightweight covering seems to work well; but beginners who paste up paper, garbage bags, or Tyvek℠ often have better flight performance than experienced makers who sew together esoteric materials (here, it seems that the experts are hoist by their own sewing machines that turn out unsymmetrical coverings). Another fault of sewn Alliflexes is leading edges that are too tight. Do NOT take darts in the leading edges to create an airfoil shape of compound curvature.

Longerons may be sprung, sleeved, glued, taped, or pocketed on either the front or the back of the covering--canopy--material.

*

KNOTS —*continued from page 2*

me might not work best for you; but I think you won't go too far wrong if you start with what I've presented here.

§ Kevlar® is truly wonderful stuff. Ask any of the stunt-kite experts. In case you don't know, Kevlar® is five times stronger than is a steel wire of equal cross section. It has almost no stretch—an ideal quality for control lines, but the material has poor knot strength. Even the Bimini twist fails to provide knot strength beyond 40%. One expedient solution is to use a device called a *fid* to sheath the Kevlar® within a short length of braided dacron tubing, then tie the composite assembly with a regular knot. The dacron sheath pads the Kevlar® from attritional strains.

The average kite flyer can use a splicing needle or a length of fine wire—instead of a fid—to pull the Kevlar® into the bore of the piece of braided dacron or nylon.

If at this point, you wonder "Why bother?" —consider these reasons:

§ Once you have confidence in your flying line and its knots, you can use a smaller diameter line. A smaller diameter usually costs you less; more can be fitted onto your reel, or you can use a smaller reel. Smaller line has less drag and weight; the performance of a kite on a smaller line usually is better.

§ Even if you decide not to use a smaller line, you will feel more confidence in what used to be marginal conditions.

§ You will suffer fewer break-aways. Line almost always breaks at a knot.

*

An addendum from the Non-editor:

SCIENTIFIC AMERICAN, *August 1983, has a mathematical dissertation by Jearl Walker in which the author examines the capabilities of knots to hold—or slip—depending on their wrap-arounds, wrap-overs, and the coefficients of friction of the materials in contact.*

Jearl Walker's article meshes well with the resourceful pioneering of Marty Sasaki. The article may be found in "The Amateur Scientist" department on p. 120 and pp. 123-27.

*

Q & A DEPARTMENT

Q: Have you ever seen one of Tom Abrams' beautiful tetrahedral kites?
A: Yes, indeed. Tom presented PMAF with a red-and-black 16-celled, bodacious beauty.

Q: Does a quarterly journal have to be published four times each day?
A: No.

Q: The president of my kite club makes copies of *Data Letter* and sells them at half price to us members. Is that legal?
A: No. Please send us the name of your club.

Q: Does PMAF make any profit from kite plan sales and *Data Letter* subscriptions?
A: No, but we're getting healthier: our operating losses per month are now two-digit.

Q: Do you support the wholesome goals of American Kitefliers Association?
A: Yes. The Non-editor's an AKA life member.

*

FLY HIGH IN COLUMBUS IN OCTOBER!

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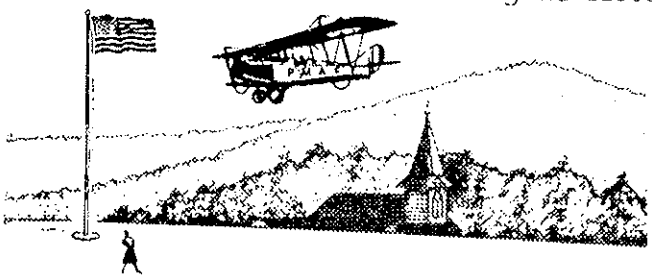
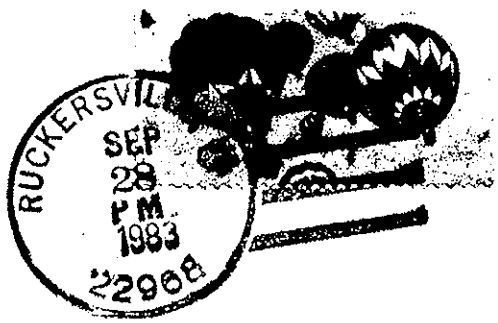


NORTH AMERICAN READERS, please notice:
Commencing on 1 January 1984, the annual subscription price for *PMAF DATA LETTER* will increase to $10.00 for a year of 12 issues.
Until 31 December 1983, advance renewals will be accepted at the old price of $8.50, but renewals beyond December 1985 are invalid.



Feb 1985
(S 332)

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